

## PATENT SPECIFICATION



Convention Date (Germany) : Feb. 27, 1937.

507,254

Application Date (in United Kingdom) : Feb. 26, 1938.

No. 6089/38

Complete Specification Accepted : June 13, 1939.

## COMPLETE SPECIFICATION

## Improvements relating to the Treads of Wheel Tyres

I, ERWIN MÜLLER, of 3, Boddinstrasse, Berlin-Neukölln, Germany, of German Nationality, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

This invention consists in an elastic wheel tyre having a tread comprising cells with closable air passages provided, in the direction of rotation, at the front and rear ends in the compressible walls of the said cells, the transverse cross section of the passages converging from the centre towards the sides thereof and terminating at each side of said cross-section in an acute angle. This cross-sectional form of the air passages has the great advantage that under the load the passage closes fully over the whole width up to the end of the angle at both sides. In contradistinction thereto, an air passage of circular cross-section can never close fully even under the greatest load. These tyres are notable in that on the one hand they give great security from skids due to the sucking action of the cells on the road surface after the weight of the vehicle has compressed the cell walls and thereby closed the said passages, and on the other hand they reduce the rate of wear of the tyre material (rubber) because, at the moment that the front edge of the cell wall rises from the road, the air passages open and by equalizing the air pressure inside the cells with that outside the cells, prevent the cells from clinging to the road surface by suction.

When the said cells all lie adjacent to one another and are divided only by the thickness of their walls, which must be thin because they must be sufficiently compressible to enable the load to close the air passages, the tyre can efficiently carry only a comparatively small load per square centimeter or square inch of its surface and therefore even for lightly loaded vehicles, the tyre must be wider than tyres without suction cells in order to carry the load efficiently.

According to the invention, the advantage of the said cells is retained whilst obviating the necessity for wider tyres by providing the tread with the said cells in combination with solid studs and/

or ribs which project from the base of the tread and act with their edges in known manner as protection against skids whilst also relieving the compressible cell walls of some of the load by acting as carriers of the main portion of the load. So that the closable air passages shall close with certainty, it is advantageous to provide the cell wall at the place where the air passage is situated, with a thickening or bulge which protrudes beyond the remaining part of the tread surface. In order that the air passages shall open again at the correct time, the air passages are restricted in longitudinal section between their orifices.

The cells and solid parts may be arranged in annular rows with the cells alternating with the solid parts in each row, or in annular rows with the cells in separate annular rows from the solid parts, or there may be a combination of these two arrangements on the same tread. The cells and solid parts may be arranged in staggered positions. The solid parts may be of stud like and/or rib-like form. A solid part of rib-like form may be situated between two rows of cells or two rows containing solid parts and cells. The cells may vary in size, and the size of cells which lie at the outer side of the wheel tyre when the wheel tyre is mounted on a vehicle may be smaller than those at the inner side, in order to obtain an increased security against side slipping of the vehicle when travelling round a bend.

The accompanying drawings show some constructional examples of the tread surface of tyres with cells and solid parts according to the invention, the depressions in the elevational Figures being emphasized by horizontal hatchings.

Figure 1 is a fragmentary elevation of a tyre tread. Figure 2 is a cross-section on line A-B of Figure 1. Figures 3 and 4 show fragmentary elevations of other constructional forms. Figures 5 and 6 show to a larger scale a fragmentary longitudinal section and cross section through a part of a cell.

In Figures 1 and 2, *a* are the deepened cells the compressible boundary walls of which have an air passage *b* at the front and rear end in the direction of travel.

[Price 1/-]

Price 4s 6d Price 25p

The transverse cross-section of the air passage *b*, Figure 5, converge from the centre towards the sides thereof and terminate at each side of the said cross-section in an acute angle to ensure complete closure on compression of the wall containing it. A thickening or bulge *c* is advantageously provided on the cell wall opposite the passage *b* to more effectively close the passage on compression of the said wall. Alternately with the cells, there are provided solid projecting parts or studs *d* the said solid parts or studs of the outer rows being opposite cells of the inner rows. In this constructional form there is also provided between the two pairs of rows, a central, narrower row of interconnected studs forming a peripheral fillet or rib *e*.

In Figure 3 the cells *f* having the air passages *b* in their compressible walls are trapezium shaped and lie in two rows in staggered positions relative to the solid projecting parts or studs *d*, which are arranged in a peripheral row.

In Figure 4 the cells *g* and *h* having air passages *b* in their compressible walls are hexagonal. They lie at both sides of the solid projecting part *k* forming a central fillet or rib, the cells *h* alternating with solid projecting parts or studs *i* on one side of the central rib. As is evident, the cells *g*, on the other side of the rib which do not alternate with studs, are larger than the cells *h*, and the tyres are to be so placed on the wheels that the shorter cells *h* are at the outer side.

From Figures 5 and 6 it can be seen that the air passage *b* has a restriction *l* between the inlet and outlet orifices. This restriction assists the opening of the passage by preventing the sides of the said orifices from sticking together sufficiently to resist the opening effect produced by the material of the cell wall when relieved of load.

The surfaces of the passages *b* need not be arcuate. They can for example be of flat trapezium form in cross-section. The surface of the thickening or bulge *c* need not be arcuate. It may for example be composed of flats.

Having now particularly described and ascertained the nature of my said inven-

tion and in what manner the same is to be performed, I declare that what I claim is:—

1. An elastic wheel tyre having a tread comprising cells with closable air passages provided, in the direction of rotation, at the front and rear end in the compressible walls of said cells, the transverse cross-section of the passages converging from the centre towards the sides thereof and terminating at each side of the said cross-section in an acute angle, the tread being provided with the said cells in combination with solid studs and/or ribs which project from the base of the tread and act with their edges in known manner as protection against skids whilst also relieving the compressible cell wall of some of the load by acting as carriers of the main portion of the load.

2. An elastic wheel tyre according to claim 1, characterized in that the cell walls relieved by the studs and/or ribs are provided at that place where an air passage is situated, with a thickening or bulge which protrudes beyond the remaining part of the tread surface.

3. An elastic wheel tyre according to claim 1, characterized in that the said air passages are restricted in longitudinal section between their inlet and outlet orifices.

4. An elastic wheel tyre according to claim 1, characterized in that the said cells and the solid studs are staggered.

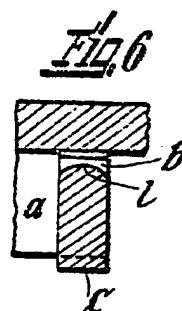
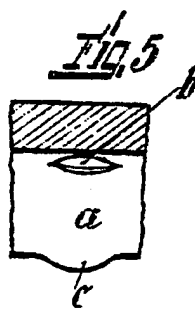
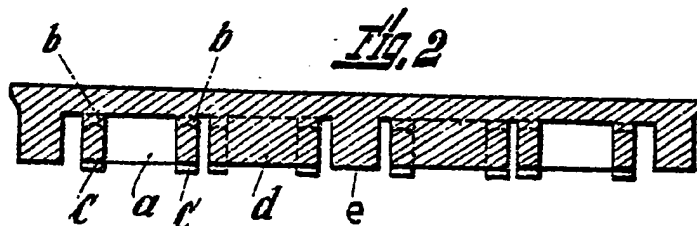
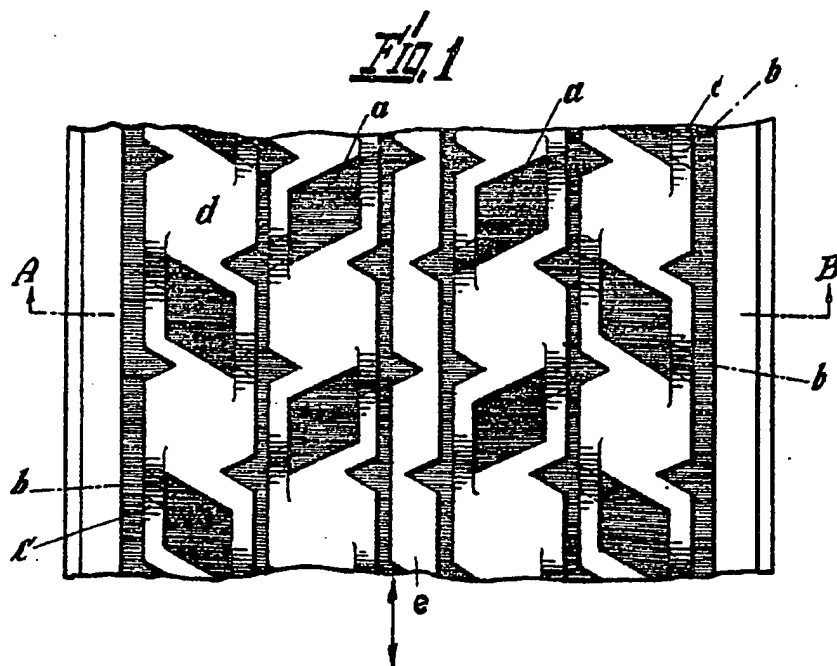
5. An elastic wheel tyre according to claim 1, characterized in that the said cells and the solid studs are arranged alternately in a peripheral row.

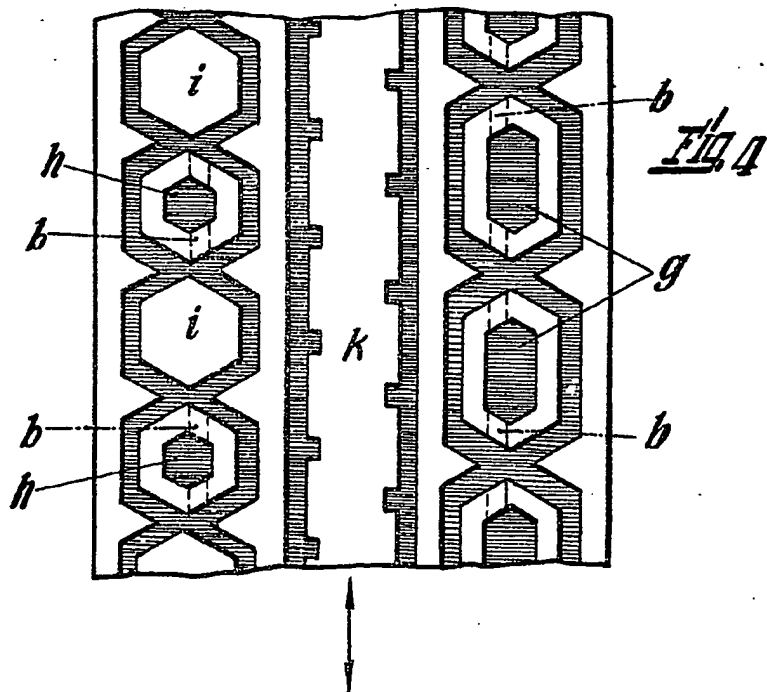
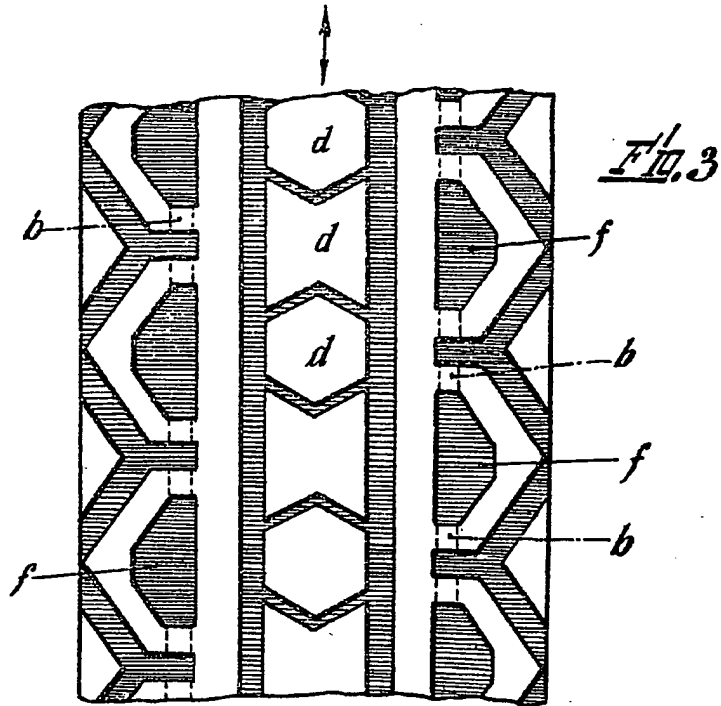
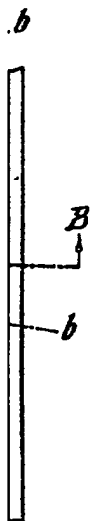
6. An elastic wheel tyre according to claim 1 or 5, characterized in that the cells of the row which lies at the outer side on the vehicle are smaller than the cells lying at the inner side.

Dated the 17th day of February, 1938.

For the Applicant,  
F. BOSSHARDT,  
Chartered Patent Agent,  
31, Regent House, Cannon Street,  
Manchester, 4.

[This Drawing is a reproduction of the Original on a reduced scale.]





507,254 COMPLETE SPECIFICATION

SHEET 1

3 SHEETS  
SHEET 2

[This Drawing is a reproduction of the Original on a reduced scale]

